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Demountable Stub Post

It is known to allow over-height container cargo, to project above container height - as defined by the tops of corner lift facilities.

- A special crane suspension, or spreader, with elongated arms is used to reach down past
- 5 projecting cargo for container capture and lift.

Alternatively to a special crane, it is known to use post extensions - such as upon corner support posts - which bring capture, handling and support fittings back within standard crane reach.

When post extensions are fitted to folding posts, as in platform base containers, provision is made for accommodating extended posts in the base.

- 10 Typically, the extension, along with a main (base) post, is located in dedicated, specially elongated, base recesses - where the base configuration so allows without undermining the structure.

With a permanent (either welded or bolted) post extension - aside from wholesale extended post removal - there is little option but to carry an entire extended post collapsed on board.

- 15 Permanent post extensions on non-folding flatracks take up valuable potential cargo space when not required.

This means a lack of operational flexibility.

Severable

- Even if severable when not required, such extensions represent an unproductive passive load
- 20 if carried on board - or present a logistics storage problem if discarded.

In addition, removable extensions have previously employed conventional twist locks - on occasion with modest screw tightening facility.

However, with simple manual techniques and tools, a conventional twist lock screw cannot be tightened sufficiently to brace imposed (transverse) racking loads.

- 25 Post extensions have not hitherto had a role independent of a base post.

Re-Deployment

In the present case, extensions are demountable and re-deployable, as independent (corner) stub posts upon a platform base, for low profile loads such as pipes.

- To this end extensions are provided with releasable base couplings, compatible with standard
- 30 container capture, handling and support fittings.

Statement of Invention

According to one aspect of the invention,
a demountable post extension (or extender)
has a clamp action mounting at one (base) end.

- 5 A wedge driven (mechanically advantaged) clamp action can be used.

In particular, a transverse movable wedge (21) is operable for longitudinal movement of a depending mounting jaw (22).

The wedge movement is desirably screw-driven.

- 10 Conveniently, the mounting is comprises a rotatable jaw, locatable in a base mounting plate (profiled) aperture, with mechanically advantaged clamp screw drive.

Such a clamp drive could feature a screw mounted wedge, to interact with a slotted carrier for a depending mounting jaw.

- 15 Operationally, a depending tongue is initially inserted into an aligned base mounting slot of a base post or flatrack base, then re-aligned - say, by rotation - relative to the slot, to inhibit tongue withdrawal, preparatory to clamp action.

In a particular construction, clamp drive screw rotation retracts the tongue until it contacts the underside of a plate bounding a base mounting slot.

Optionally, a post extension may feature a profiled lip or depending flange, to inhibit post rotation upon screw tightening.

- 20 An inset depending abutment, locatable in a lateral extension of a tongue reception slot, may also be employed to inhibit post rotation upon tightening.

In a particular embodiment,
a post extension comprises
an elongate tubular body,

- 25 a carrier or traveller movable longitudinally of the body,
with a depending locating and locking tongue,
protruding from a base plate,
a transverse positional adjustment screw,
for engagement with a wedge

- 30 located in a longitudinal slot in a carrier,
so that screw rotation
draws the wedge along the screw length
and moves the carrier and in turn tongue
longitudinally of the post.

- 35 Post extensions could be configured for co-operative mounting upon other post extensions.

A restraint tie, such as a clamp screw retention element, may be employed to inhibit inadvertent demount.

A container, such as a collapsible flatrack, may be fitted with a demountable post extension. Such a container, may incorporate bespoke profile recesses in a platform deck, to accommodate demounted post extensions.

Embodiments

- 5 There now follows a description of some particular embodiments of demountable stub posts, or post extenders, for use with collapsible flatrack containers, platform decks or collapse foldable support posts and/or walls, by way of example only, with reference to the accompanying diagrammatic and schematic drawings, in which:

- 10 Figures 1A through 1E show flatrack containers with four individual corner (handling, lifting and stacking) support posts fitted with respective demountable post extensions.

These support posts may be of fixed length, or themselves telescopically extendable (not shown).

More specifically:

- 15 Figure 1A shows a perspective view of a flatrack container with one corner support post being fitted with a demountable (stub) post extension.

The relative lengths or working heights of post base and extension admit of considerable variation according to operational circumstances.

Generally, albeit not necessarily essentially, the extension is somewhat shorter than the base - hence the qualifier 'stub' post.

- 20 Figure 1B shows a perspective view of the flatrack container of Figure 1A fitted with demountable post extensions on each existing corner (base) post.

Figure 1C shows a side elevation view of the flatrack container of Figure 1A without demountable post extensions, loaded with freight taller than the existing post height.

- 25 Figure 1D shows a side elevation view of the flatrack container of Figure 1C fitted with demountable post extensions - affording additional load depth or height capacity and overhead clearance.

Figure 1E shows a side elevation view of three of the flatrack containers of Figure 1D stacked upon one another.

- 30 Figures 2A through 2E show flatrack container bases being fitted with demountable (stub) post extensions.

More specifically:

Figure 2A shows a perspective view of a flatrack container base with a demountable (stub) post extension being fitted at a corner.

Figure 2B shows a perspective view of the flatrack container base of Figure 2A fitted with

demountable (stub) post extensions on each corner.

Figure 2C shows a side elevation view of the flatrack container base of Figure 2A without demountable post extensions, loaded with freight taller than the corner (capture, handling and support) fitments.

- 5 Figure 2D shows a side elevation view of the flatrack container base of Figure 2C fitted with demountable post extensions - giving additional load depth capacity and marginal overload clearance.

Figure 2E shows a side elevation view of five of the flatrack container bases of Figure 1D stacked upon one another.

- 10 Figures 3A through 3C show side elevation views of a demountable (stub) post extension being fitted upon a support post, such as of Figure 1A.

More specifically:

Figure 3A shows a demountable (stub) post extension being offered up to a support post of Figure 1A - with depending locating and locking tongue ready for insertion into a post top (box) capture, handling and support fitting.

- 15 Figure 3B shows the demountable post extension of Figure 3A being rotated with respect to the support post of Figure 1A - for depending locating and locking tongue capture in a profiled fitting aperture or slot.

- 20 Figure 3C shows the demountable post extension of Figure 3B being secured in position by tightening a bespoke screw clamp fitting.

Figures 4A through 4C show sectional views of the demountable (stub) post extension of Figure 3A.

More specifically:

- 25 Figure 4A shows a sectional view of the demountable (stub) post extension of Figure 3A depicting locating and locking flanges of a depending, protruding tongue.

Figure 4B shows a sectional view of the demountable (stub) post extension of Figure 3A taken along the broken line of Figure 4C, illustrating a wedge-screw configuration for retracting the depending, protruding tongue - to achieve a clamp location and mounting action.

- 30 Figure 4C shows a cross-sectional view of the demountable (stub) post extension of Figure 3A depicting orientation of wedge, screw and tongue elements.

Figures 5A through 5D show side elevations of a demountable (stub) post extension with side lips, being fitted onto a support post of Figure 1A.

More specifically:

- 35 Figure 5A shows a demountable (stub) post extension with side lips, with depending tongue being inserted into a support post of Figure 1A.

Figure 5B shows the demountable (stub) post extension of Figure 5A being rotated with respect to the support post of Figure 1A.

Figure 5C shows the demountable (stub) post extension of Figure 5B being secured in position by the tightening of a locking screw.

- 5 Figure 5D shows an enlarged view of one corner of the demountable (stub) post extension of Figure 5C with profiled edge lip, to inhibit demountable post extension movement (specifically, rotation or lateral slip) with respect to the support post, upon locking screw tightening.

Figures 6A through 6C show sectional views of the demountable (stub) post extension of Figure 5A.

- 10 More specifically:

Figure 6A shows a sectional view of the demountable (stub) post extension of Figure 5A, depicting locating and locking flanges of the depending, protruding tongue.

- 15 Figure 6B shows a sectional view of the demountable (stub) post extension of Figure 5A taken along the broken line of Figure 6C, depicting the wedge-screw configuration for retracting the protruding tongue.

Figure 6C shows a cross-sectional view of the demountable (stub) post extension of Figure 5A illustrating the orientation of the wedge, screw and tongue sections.

Figures 7A through 7F show a variant stub post extension being mounted on an existing support post.

- 20 More specifically:

Figure 7A shows a cross-section of a demountable stub post being inserted into a support post of Figure 1A.

Figure 7B shows a cross-section of the stub post of Figure 7A secured in position.

Figures 7C through 7F are indicative schematics of stub post installation.

- 25 Figure 7C shows a perspective view of the stub post of Figure 7A being inserted into the top capture and handling fitting - such as a standard box casting - of an existing (base) post to be extended.

Figure 7D depicts orientation of a depending stub post tongue, once it has been inserted into a base post top capture and handling fitting of Figure 7C.

- 30 Figure 7E depicts orientation of the depending stub post tongue once the extension has been rotated 90 degrees in an anti-clockwise direction from Figure 7D.

Figure 7F shows the configuration of Figure 7E with stub post base fully in contact with the top of base post capture and handling fitting - allowing inner lip projections on the stub post base to slot into the capture and handling fitting slot for added security.

Figure 8 shows a flatrack container base fitted with four stub post extensions set inboard of the container ends.

Figure 9 shows a flatrack container base with bespoke profiled recesses to accommodate demounted stub post extensions.

- 5 Figure 10 shows an open top container fitted with stub post extensions at each corner.

Figure 11 shows a side-elevation view of a flatrack with folding end posts fitted with stub posts of the present invention.

Figures 12A and 12B show flatracks of Figure 11, each loaded with over-height cargo, being lifted one on top of the other.

- 10 More specifically:

Figure 12A shows a flatrack loaded with over-height cargo and fitted with post extensions being lifted by standard crane spreader lift equipment onto a similar flatrack below.

Figure 12B shows the flatracks of Figure 12A stacked one on top of the other as the lifting frame is removed.

- 15 In the illustrations, stacked flatracks could be coupled together and handled as a unitary load, using standard capture, handling and support end fittings, such as twist locks in box castings.

Referring to the drawings...

(Stub) post extenders (or extensions) 10 are configured for attachment to existing posts 11 - as shown in Figures 1A through 1E, and flatrack bases 12, as shown in Figures 2A through 2E.

- 20 Attachment can be made to existing standard top (corner) capture handling and support fittings, such as box castings 13, with conventional twist locks.

An post extender 10 features at one (lower) end a special clamp tightening facility according to the invention, to inhibit relative movement of extension 10 and (base) post 11.

- 25 At the opposite (upper) end, a post extender 10 is fitted with a standard capture, handling and support fitting, such as a box casting 18 for a conventional twist lock.

Effectively, post extenders 10 are self-contained (mini) post elements - and may be fitted to any freight container 20 with existing (corner) handling and lifting fittings 13.

However, post extenders 10 differ from conventional posts 11, by their special (base) location and clamping and facility.

- 30 In some circumstances, a modular approach may be adopted, with successive post extenders 10 coupled together serially or in tandem - although each interconnection must be firmly securable against relative movement.

Thus, (stub) post extenders 10 may be fitted to folded flatracks, platform flats with no posts, open top containers 33 and closed top containers (not shown).

Thus, for open-top containers 33, post extenders 10 can provide for load space above side wall height or depth - as depicted in Figure 10.

- 5 Albeit not shown, individual post extenders 10 may also be mounted upon other post extenders 10 of the same or different span and in different (but equivalent cumulative span) combinations - for yet further cargo clearance height.

In addition end walls / doors 14 may be fitted between existing end posts 11.

- 10 In principle, (stub) post extenders 10 may be provided in a variety of different lengths to suit circumstances, however, 1ft (0.3m) and 2ft (0.6m) versions are thought to be particularly useful.

The main requirement for a (stub) post extension 10 is illustrated in Figure 1C where a container cargo 15 protrudes above the height of existing posts 11.

This can result in handling difficulties and makes stacking of like containers unpractical and particularly undesirable when fragile cargo 15 is involved.

- 15 Thus, the (stub) post extender 10 extends the height of existing posts 11 to fully accommodate cargo 15 - as shown in Figure 1D.

This configuration allows standard lifting equipment 35 to be employed.

- 20 More specifically, as shown in Figure 12A, post extenders 10 provide cargo 15 clearance to allow capture, handling and support fitting access for a spreader beam 36, carried by crane lift suspension 35.

(Stub) post extenders 10 are configured to grip tightly upon top corner castings 13 with minimal (lateral) free play to inhibit transverse racking from the extended height.

- 25 The extra height of the (stub) post extenders 10 imposes additional strain upon base hinges and end frames 14 of flatracks 20 and frames of open top containers 33 - which must be taken into account in permissible loading calculations.

More specifically, 2ft (0.6m) (stub) post extenders 10 are specifically designed for ...

- 15 ton (15,241kg) per end 16 transverse racking,
- 7.5 ton (7,620kg) per side 17 longitudinal racking,
- 30 • 86 ton (87,380kg) stacking, and
- 45 ton (45,722kg) maximum gross weight (MGW) top lift.

Some flatracks 20 may be designed to support 2ft (0.6m) post extenders 10 at full rating and also accommodate (stub) post extenders 10 when end walls 14 and existing posts 11 are collapse folded into base 12 - as illustrated in Figure 11.

- 35 3ft (0.9m) post extenders 10, can withstand 2/3rds of the racking forces of ISO.

If the flatrack 20 or open top container 33 is not designed to support (stub) post extenders 10,

additional on ship lashing may be required or necessitate that the container be placed below deck in cell guides.

Fitting (Stub) Post Extenders

Note that there are right-hand and left-hand (stub) post extenders 10, identifiable by each having a top corner casting 18 right or left-handed.

- 5 In order to clamp (stub) post extenders 10 to a container 20 screw 19 should be undone to slacken off wedge 21.

Depending tongue 22 should then be inserted into the top corner casting 13 of an existing post 11 or flatrack base 12.

- 10 The whole (stub) post extender 10 should then be rotated through 90 degrees, so that:

- tongue 22 is locked inside corner casting 13;
- post extender 10 top casting 18 is orientated with end 16;
- with side 17 facing outwards from the container 20
- as the relevant ISO standard specifies.

- 15 The back face 23 of the base plate 24 should then be aligned with the back face 25 of the top corner casting 13 of container 20.

Screw 19 should then be tightened whilst looking through aperture 26 to ensure tongue 22 is drawing smoothly into a clamped position.

- 20 Optional side plate 32 and edge lip 31 on base plate 24 (shown in Figure 5C), act to prevent stub post 10 movement relative to casting 13, while screw 19 is tightened.

Plate 24 incorporates inner lips 37 (shown in Figures 7A through 7E) which project downwards into the top slot of corner casting 13 only once post extender 10 has been rotated into its locked position.

Thus, inner lips 37 also inhibit stub post 10 rotation and movement.

- 25 Once clamped, tongue 22 abuts the top of corner casting 13 surrounding the orthogonal entry slot 39.

This abutment inhibits rotation of (stub) post extension 10 - so it cannot unlock itself.

- 30 When screw 19 is fully tightened, it may be secured and prevented from undoing itself by passing a 3mm steel wire 27 or equivalent through a hole 28 in a head 29 of screw 19 and on through a hole 30 in base plate 24.

Twisting the ends of wire 27 together (with hand grip tools such as pliers) should mean that it cannot come accidentally undone.

The above procedure should be repeated at all four corners to obtain a fully operational extended container 20.

(Stub) Post Extender Removal

Generally, removal of (stub) post extenders 10, may be achieved by carrying out the installation fitting instructions (above) in reverse order.

- 5 However, in order to release wedge 21, it may be necessary to apply sudden shock impact (tap) disturbance initially to dislodge head 29 of screw 19 once un-tightened, thereby urging wedge 21 out of engagement.

Once post extender 10 has been removed, screw 19 should be tightened and retaining wire 27 (re-)fitted through holes 28, 30 in screw 19 and plate 24, to prevent loose parts from getting lost.

- 10 Operationally, all four post extenders 10 should be used and kept together.

Post extenders 10, according to the present invention, are specifically designed to provide high operational strength at low production cost.

They can be securely locked in position, with little or no free play between the existing post 11 or base 12 and the post extension 10.

- 15 In addition, they can be easily fitted or removed using standard manual techniques.

It should be noted that, although not shown, the extension stub post 10 could itself be telescopically adjustable, or assembled from smaller post elements.

A post extension 10 may be mounted upon any capture, handling, and support fitting 13, whether disposed at or intermediate container ends - as shown in Figure 8.

- 20 Thus, say, a standard 40ft (12.2m) long container may feature post extenders 10 arranged to form eight posts of the same overall height - say, with four posts in the centre and four at the corners - to support two 20ft (6.1m) long containers above.

Further, de-mounted stub posts 10 may be parked or accommodated within bespoke recesses 34 in a container base 12 - as illustrated in Figure 9.

- 25 Summary Overview

Generally, a modular stub post extension 10 regime may be adopted, with prescribed lengths - each with a locating and secure clamping facility to ensure minimal free-play and attendant racking when fitted.

- 30 Extension modules 10 can be orientated or handed according to intended corner installation position - with associated coded identification markings.

The locking action replicates that for which existing corner capture, handling and support (box casting) fittings 13 are configured - such as standard twistlock action.

- 35 A mounting plate 24 at the extender 10 bottom provides an abutment interface between extender 10 and mounting fitting box 13, with only a locating and locking tongue 22 admitted into a profiled aperture of the box fitting 13.

A translation or draw wedge 21 acts between the upper surface of abutment plate 24 and depending locating and mounting tongue 22 to contrive relative movement therebetween.

Mix and Match Features

Generally, in the embodiments, where feasible and appropriate, features may be mixed and
5 matched to suit circumstances.

It is not feasible to describe every such feature combination.

Claim Brackets

In the claims, phrases in brackets, vis { ... }, alongside claim numbering are for ease of reference and themselves form no part of claim scope or interpretation.

10 Component List

10	post extender
11	existing post
12	base
13	corner fitting/casting
15	14 end wall/gate
	15 cargo
	16 end
	17 side
	18 extender top fitting
20	19 screw
	20 flatrack container
	21 wedge
	22 tongue
	23 back face
25	24 base plate
	25 back face
	26 aperture
	27 wire
	28 hole
30	29 head
	30 hole
	31 edge lip
	32 side plate
	33 open top container
35	34 extender recess
	35 lifting equipment
	36 spreader plate
	37 inner lip
	38 carrier
40	39 entry slot